HM Heat Meter

Installation and operating instructions

The compact mechanical heat meter HM is suitable for the measurement of energy consumption in heating plants filled with the energy carrier liquid water. These installation and operating instructions specify the installation and the operation of HM and its variants. It is an essential part of the delivered items and has to be handed over to the final user.

Delivered items

HM (if applicable with already connected temperature sensors)
installation and operating instructions

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1. Important directions

The installation of HM requires adequate professional knowledge and should be carried out by specially trained persons only.
The technical data specified in chapter 2 must not be exceeded during operation.
The connection cable between temperature sensor and calculator must not be cut, shortened or extended.
During the installation of HM, the well or ball valve, particular care is to be taken that they are perfectly mounted, because otherwise there might be the danger of being scalded by leaking heating liquid. Therefore, first of all, the stop cocks are to be closed before removal.
Depending on manufacturing conditions the brass connection threads might be sharp-edged. Therefore we recommend wearing protection gloves.
Heat meter is a measuring instruments and have to be handled with care. In order to protect them against damages and soiling they should only be taken from the package immediately before installation.
The instrument must not be carried by the cable.
For cleaning purposes use nothing else but a cloth moistened with water.
Within the instrument there is a battery, which must not be opened by force, come into contact with water, be short-circuited or exposed to temperatures exceeding 80 °C.
Empty batteries, no longer needed electronic instruments or components are hazardous waste and to be disposed of at suitable collecting points.
If several meters are used in the same billing unit, equal instrument types should be chosen in the interest of the fairest possible consumption billing.

Mains-operated instruments:

2. Technical data

Temperature measuring range	Θ = 5 - 90 °C
Temperature difference range	ΔΘ = 5 - 90K
Switch-off threshold	0.15K
Measuring accuracy	Better than (%) $\pm(0.5+\Delta\Theta_{min} / \Delta\Theta)$
Updating times and integration cycles resp.: Temperatures Flow rate, power Energy, volume	 2 sec 4 sec 4 sec (16 sec *) * in case of battery supply
Optical data interface	Physical acc. to EN 61107 Data record acc to EN 13757-3
Suitable temperature sensors	Pt 1000 (see inscription at enclosure) Connection in two- or four-wire technology
Power Supply (using period of the meter may be the defined by national laws)	Battery for 10 years or mains supply 230 V AC resp. 24 V AC
Electromagnetic environment condition	Class E 1
Mechanical environment condition	Class M 1
Protection class	IP 54
Ambient temperature	5 55 °C
Storing temperature	-20 +65 °C
Relative air humidity	< 93 %
Flow Sensor	
Temperature range	5 - 90 °C
Protection class	IP 65
Straight inlet and outlet pipes	Not required acc. to approval directives In case of stronger flow disturbances a straight inlet pipe of 5 x DN is re-commended

3. Required tools

Fork wrench in suitable size for thread connections or flange screws resp.

4. Installation of sub assemblies

HM heat meter can be used as a heating meter, in return pipes.

return pipe of heating plants: **colder line**
supply pipe of heating plants: **warmer line**

Attention!

Because of legal calibration regulations the installation place can only be in colder line.

4.1 Flow sensor

Applicable standards: EN 1434-6

Standard installation of the flow sensor is in to the colder line.

An arrow on the body shows the flow direction. The maximum operating pressure and the maximum operating temperature must not be exceeded.

It is absolutely advisable to install a dirt trap before the flow sensor or at another suitable point of the heating or chilling circuit as well as shut-off valves before and after the flow sensor (in order to avoid having to empty the pipeline if the meter is to be exchanged). During initial installation a spool piece is installed instead of the flow sensor and the pipe system is thoroughly flushed. Then close the shut-off valves, remove the spool piece, clean the sealing surfaces and install the flow sensor using new gaskets. Take care not to reduce the pipe diameter by bad positioning of the gaskets.

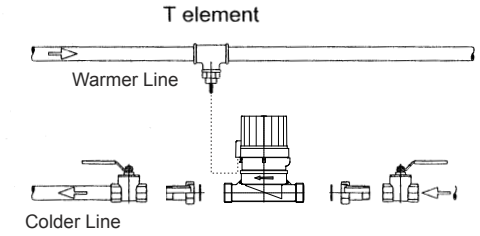
In areas with thermal layering (e.g. after the junction of two pipes with different temperatures) a straight pipe of 10 x DN in front of the flow sensor is recommended.

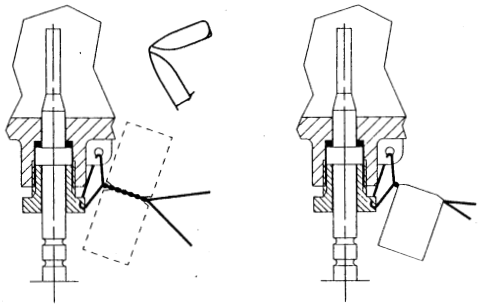
4.2 Installation of temperature sensors

HM heat meter is operated with separately approved and paired temperature sensors type Pt 1000. The applicable type is specified on the integrator frontside. The two temperature sensors can optionally be mounted in thermowells or directly into the heating or cooling liquid. We recommend using pairs of thermowells or ball valves in order to facilitate future exchange.

For a general installation standard please refer to EN 1434-2.

For temperature sensor type 45 mm x 5.2 mm (length x diameter) and DS 27.5 acc. to EN 1434- 2 we recommend the installation in our ball valves with temperature sensor retainer M 10 x 1 or complete installation kits including fitting pieces and thread connections.





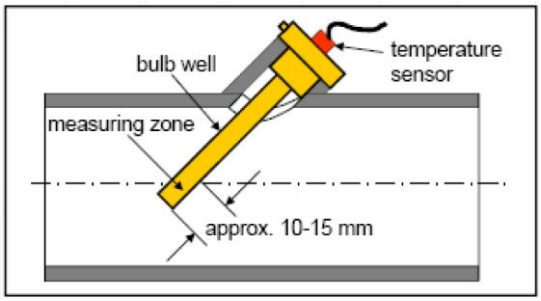
Example of temperature sensors sealing

For Teksan temperature sensors of the overall lengths 150 cm, the sensitive zone is ca. 10 to 15 mm measured from the temperature sensor's tip and has to be positioned as near as possible to the **middle of the pipe diameter.** Refer to the following guide for installing such temperature sensors:

Nominal sizes ⩽ DN 50*:
Mount the temperature sensors in an angle of 45° **towards** the flow direction (see fig. 4).

* DN < 50 an installation in a bent tube is also possible.

Fig. 4: Exemplary diagram for nominal size ⩽ DN 50



4.3 The integrator

HM heat meter is delivered with the integrator mounted on the flow sensor.

5. Display options

The different display options of HM are divided into five menus. By a stroke on the red key the first display item in the user menu (accumulated energy) is activated. The selection menu for the other five menus can be obtained by a pressure of 10 seconds onto the red key:

5.1 User menu

9496704.0 kWh	Accumulated energy consumption
27.87	Temperature in warmer line
27.53	Temperature in colder line
00.34	Temperature difference
0.000 m³	Consumption of meter
20-03-52	Current time
04-03-13	Current Date
P.1 3.70	Battery voltage
0000000.1	Meter serial number

5.2 Service menu

S 0000 P	Impeller turning in liter
S 0000 m³/h	Current flow rate
S 0000 kW	Current heating consumption
VEr 2.00	FW Version
S 0000	Total working hours
88888888 GJ/m³P/kWh	Segment test

5.3 Calibration Menu

C1 0000	Parameter of temperature in warmer line
C2 0000	Parameter of temperature in colder line
C3 0000	Flow rate calibration 1
C4 2989	Flow rate calibration 2
C5 0044	Flow rate calibration 3
C6 2847	Flow rate calibration 4
C7 0150	Flow rate calibration 5
C8 2798	Flow rate calibration 6
C9 0001	Thermal calibration

5.4 Comminication Menu

H1 0000	Comminication type
H2 0000	The primary address
H3 0000	The secondary address
H4 0000	

5.5 Archive menu

-01	Last month
41156608 kW	Energy consumption
-24	24 months ago
94967295 kW	Energy consumption

6. Functional test, sealing

Having opened the shut-off valves, test the installed units for leaks. For checking purposes the current values of flow rate, heating power as well as temperatures of warmer and colder line can be called to the display according to chapter 5 In order to protect the meter against tampering, the delivered selflock seals have to be attached to the following points:

unions of the flow sensor
insertion points of the temperature sensors

7. Possible error situations

Codes (extract)	Decoding
Err 0001	Failure of temperature sensor in warmer line
Err 0002	Failure of temperature sensor in colder line
Err 0003	Failure of flow sensor

8. M_bus module according to EN 1434-3

2 Wire terminal
Electrical isolation
Polarity reversal protection
Maximum voltage: SOV DC
Current drawn: one M_bus load
Primary of secondary addressing
Baud rate 2400 baud
Protocol: M_bus

9. Factory testing procedure

The following tests and adjustments are applied to the all heat meters:
-Static pressure test
-Volume test and calibration
-Energy test

-Static pressure test
Static pressure test is applied to all heat meters at 32 bars for 60 seconds.

-Volume test and calibration
All heat meters are installed to the test bench and M_bus cables attached to the test bench.

Volume test is applied to all heat meters for q_s, q_p, 0,1 q_p and q_i flowrates By using standing start stop method and weighing devices.

Depending on the test results for each meter, calibration datas are set to the heat meter by using M_bus.

-Energy test
Energy test is applied for following flowrates and temperature differance.

q_p 0,1, q_p

Flowrates	**Temperature differance $\triangle\Theta$**
q_p	5 K
0,1 q_p	15 K
q_i	85 K

Test temperature of the water passing through the heat meters is 50±5°C.

First energy test is applied to the heat meter at q_p flowrates and $\triangle\Theta$ 5K temperature differrance. Warmer temperature sensor and one of referance temperature sensor are fixed to the bath at 90°C. Colder temperature sensor and other referance temperature sensor are fixed to the bath at 85°C.

Second energy test is applied to the heat meter at 0,1 q_p flowrates and $\triangle\Theta$ 15K temperature differrance. Warmer temperature sensor and one of referance temperature sensor are fixed to the bath at 90°C. Colder temperature sensor and other referance temperature sensor are fixed to the bath at 75°C.

Third energy test is applied to the heat meter at q_i flowrates and $\triangle\Theta$ 85K temperature differrance. Warmer temperature sensor and one of referance temperature sensor are fixed to the bath at 90°C. Colder temperature sensor and other referance temperature sensor are fixed to the bath at 5°C.

Resolution during the test by communicating M_bus is 00000,000 litres for volume and 00000,000 wh for energy.

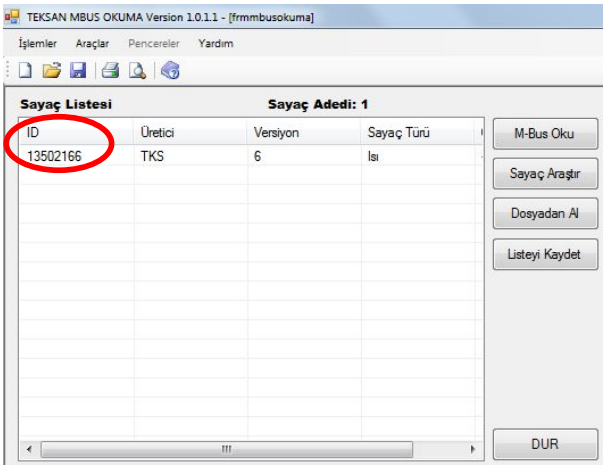
Test bench calculates the energy differance between referance energy and heat meter's energy. Results are saved in test bench computer with heat meters serial number.

10.Testing after production

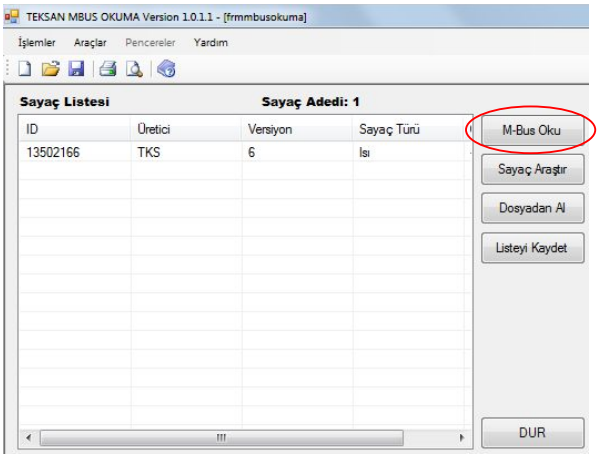
Testing after production is possible with a special register read from M_bus.

TEKSAN M_bus software can be reached by sending mail message to info@teksan.com.tr

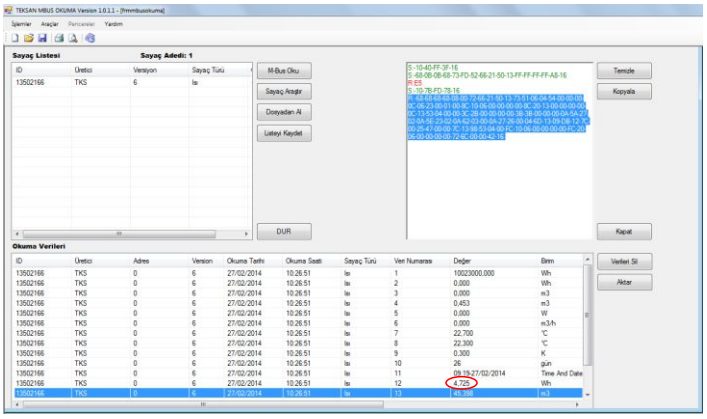
Before energy tests heat meter's serial number is entered to the TEKSAN M_bus software as marked in red.



Indexes are extracted from heat meter by pushing the button signed following in red before the test starts and after the test finishes.



Energy consumption during the test can be reached by using TEKSAN M_bus software as follows. Red circle shows the index of energy.



Energy index is shown in line 12th with the resolution of 00000,000 wh.

EC DECLARATION OF CONFORMITY

The manufacturer
(Üretici)

Teksan Teknolojik Ölçüm Sistemleri San. Tic. A.Ş.	
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Hereby declares that the following product
(aşağıdaki ürünümüz için beyan ederiz ki,)

Product name (Ürün ismi)	**Heat Meter**
Type (Modeli)	**HM DN15, HM DN20**

are in accordance with the following European Directives;
(aşağıda belirtilmiş olan ilgili yönetmelik hükümlerine uygundur;)

Reference Num. (Yönetmelik referans numarası)	**Title** (Açıklama)
2004/22/EC+2009/137/EC	Measuring instrument directive
2004/108/EC	Electromagnetic compatibility
768/2008/EC	Council Decision

and comply with the European Standards and Guides
(Avrupa standartları ve rehberlerine uygundur.)

Reference Num	**Title**
EN 1434-1	Heat meters - Part 1: General requirements
EN 1434-2	Heat meters - Part 2: Constructional requirements
EN 1434-3	Heat meters - Part 3: Data exchange and interfaces
EN 1434-4	Heat meters - Part 4: Pattern approval test
EN 1434-5	Initial verification tests for heat meters
WELMEC 7.2	Software guide
WELMEC 8.6	Measuring Instruments Directive 2004/22/EC, Presumption of Conformity of the Quality System of Manufacturers with Module D or H 1 when EN ISO 9001:2000 is applied
EC Type-examination Certificate number	SK 13-022 MI-004
Conformity Assessment body for D Module	SLM , SLOVAK LEGAL METROLOGY
Notified Body Identification Number	1432

Date (Tarih) : **30.10.2013**

Place (Yer) : **İstanbul**

Teksan Teknolojik Ölçüm Sistemleri San. Ve Tic. A.Ş. adına;

Signature (İmza) :

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